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(54) WAVEGUIDED DISPLAY SYSTEMS

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(57) **ABSTRACT**

An electronic device may have a display that emits image light, a waveguide, and an input coupler that couples the image light into the waveguide. Beam splitter structures may be embedded within the waveguide. The beam splitter structures may partially reflect the image light multiple times and may serve to generate replicated beams of light that are coupled out of the waveguide by an output coupler. The beam splitter structures may replicate the beams across two dimensions to provide an eye box with uniform-intensity light from the display across its area. The beam splitter structures may include stacked partially reflective beam splitter layers, sandwiched transparent substrate layers having different indices of refraction, a thick volume hologram interposed between substrate layers, or combinations of these or other structures. The reflectivity of the beam splitter structures may vary discretely or continuously across the lateral area of the waveguide.